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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/695,754	10/24/2000	Michael A. Nelson	CROSS1410-1	2696
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GRAY, CARY, WARE & FREIDENRICH LLP 1221 SOUTH MOPAC EXPRESSWAY SUITE 400 AUSTIN, TX 78746-6875				
			EXAMINER BARANYAI, LAWRENCE	
			ART UNIT 2665	PAPER NUMBER 5

DATE MAILED: 02/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/695,754

Applicant(s)

NELSON ET AL.

Examiner

Lawrence Baranyai

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

An initialed and dated copy of Applicant's IDS form 1449, Paper No. 4, is attached to the instant Office action.

### ***Claim Rejections - 35 USC § 112, second paragraph***

Claims 15, 21-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 15, 21-27 contain indefinite language. In particular, they include the terms "more quickly", "more slowly", and "skipped". These terms are indefinite. Clarification and/or correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 12, 13, 21, 22, 24, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over LaVigne et al. (US 6,289,066). Regarding claims 1, 12, 13, 21, 22, 24, 26, 27, LaVigne discloses a system and method to retiming signals between input and output signals running at different rates comprising: storing a plurality of successive words into storage locations in a circular memory (col. 4 lines 8-17: input clock writes data into FIFO); reading the plurality of successive words out of storage locations in the

circular memory (col. 4 lines 17-21: output clock reads data out of FIFO); maintaining a read pointer indicating a read location in the circular memory (fig. 2: extract (read) pointer 27); maintaining a write pointer indicating a write location in the circular memory (fig. 2: insert (write) pointer 26); comparing the read and write pointers to determine a number of storage locations by which the write pointer leads the read pointer (col. 5: lines 3-26); reading one of the storage locations twice in response to detecting that the number of storage locations by which the write pointer leads the read pointer is less than a predetermined minimum number (col. 5 lines 3-11; fig. 2 add region 29); and overwriting one of the storage locations in response to detecting that the number of storage locations by which the write pointer leads the read pointer is greater than a predetermined maximum number (col. 5 lines 12-26; fig. 2 delete region 30).

LaVigne discloses a synchronizer system to retime and multiplex two input data streams to one output stream. LaVigne does not explicitly disclose the synchronizer system for retiming one input and one output. However, it is obvious from the figures and disclosure that the system can be decomposed into one FIFO and its associated pointer processing and fill word control logic to provide the required functions for retiming one input to one output. All the features associated with the pointers and fill word insertion and deletion would apply to adapt an input signal, based on clock in, to an output signal, based on clock out, which differ in frequency.

One skilled in the art of communications would recognize the advantage of using the system and method of LaVigne to retime a single signal from node to node in a multi-hop network to reduce the jitter that would otherwise accumulate from node to

Art Unit: 2665

node as suggested by the applicant (see p. 2 background). It would have been obvious for one of ordinary skill in the art at the time of the invention when presented with the retiming system of LaVigne, to use retiming features of LaVigne for one input channel and one output channel, in order to be able to improve the jitter performance in a multi-hop data network.

2. Regarding claim 2, LaVigne discloses the limitation wherein comparing the read and write pointers to determine a number of storage locations by which the write pointer leads the read pointer is not performed each time one of the storage locations is read (col. 4 lines 51-53: only permissible to modify FIFO if locations contain fill words, such as IDLE or CONFIG, not if the storage location contains data).

3. Regarding claims 3, 18, LaVigne discloses limitation wherein the control logic is configured to compare the positions of the read and write pointers when one of the pointers has a value of 0 (col. 4 lines 31-33: idle and config (fill words) are always in the first byte. I.e., byte 0, location 0.)

4. Regarding claims 4, 14, 23, 25, LaVigne discloses the limitation further comprising examining a plurality of words in the storage locations, detecting that one of the plurality of words is a fill word, wherein reading one of the storage locations twice (or more) comprises reading the storage location containing the fill word twice (or more), and wherein overwriting one of the storage locations comprises examining the plurality of words in the storage locations, detecting that one of the plurality of words is a fill word and overwriting the storage location containing the fill word (col. 5 lines 3-26).

5. Regarding claim 5, LaVigne discloses the limitation further comprising determining which of the plurality of successive words are fill words and for each of the plurality of successive words providing an indication of whether the word is a fill word (col. 6 lines 8-10, 14-16: system determines if FIFO contains IDLE or CONFIG fill words. See also fig. 3 decision 120 and 140).
6. Regarding claims 6, 9, 16, LaVigne discloses the limitation wherein providing the indication comprises adding a bit to each word, setting the bit if the word is a fill word and clearing the bit if the word is not a fill word (fig. 3 Yes/No flags out of fill word decision boxes 140 and 120).
7. Regarding claims 10, 19, LaVigne discloses the limitation wherein comparing the read and write pointers to determine a number of storage locations by which the write pointer leads the read pointer comprises determining a value for the number of storage locations by which the write pointer leads the read pointer which is maintained for at least one half of a clock cycle (fig. 2: neutral region 28).
8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over LaVigne et al. (US 6,289,066) as noted for claims 1-6, 9-10, 12-14, 16, 18-19, 21-27 above, and in further view of Wang (US 5,563,891). LaVigne discloses a system and method for retiming of input and output signals of different frequencies, as noted for the above claims. LaVigne does not explicitly disclose that the pointer adjustments can be based on the difference (subtraction) between the read pointer and write pointer.

Art Unit: 2665

Wang, in the analogous field of communications, discloses that the pointer adjustments can be driven from the difference between the read pointer and the write pointer (fig. 6 SYNCHRONIZER: write pointer 115, read pointer 125, comparison circuit 130, phase difference, justification circuit 135, feedback thru gate 145, input to RD pointer 125).

One skilled in the art of communications would recognize the advantage of using the difference between the pointers to simplify the design used to determine the required pointer adjustment. It would have been obvious for one of ordinary skill in the art at the time of the invention when presented with the pointer difference of Wang, to use the pointer difference feature of Wang in the retiming system of LaVigne, in order to simplify the design.

9. Claims 7, 8, 11, 15, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over LaVigne et al. and Wang as noted for claims 1-6, 9-10, 12-14, 16, 17, 18-19, 21-27 above, and in further view of Parruck (US 5,331,641). LaVigne discloses a system and method for retiming of input and output signals of different frequencies, as noted for the above claims. Wang teaches the use of subtraction between the pointers to determine the pointer adjustment. LaVigne and Wang do not teach multiple buffer thresholds, priority and delay.

Parruck, in the analogous field of communications, discloses a method and apparatus in which pointer adjustments are based on multiple buffer thresholds and priority based on delay (fig. 3). Pointer adjustments are implemented with higher priority if the hard limit (high threshold) is crossed. In this case, the pointer adjustment is applied after frame count > short (predetermined short delay), Pointer adjustments are implemented with low priority if the soft limit (low threshold) is crossed. In this case, the pointer adjustment is applied after frame count > long (predetermined long delay).

One skilled in the art of communications would recognize the advantage of using multiple thresholds, priority and delay features in a retiming system to improve performance. It would have been obvious for one of ordinary skill in the art at the time of the invention when presented features of Parruck, to incorporate the features of Parruck, in the retiming system of LaVigne, in order to improve the performance of the system.

#### ***Citation of Relevant Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mejia (US 6,625,241) discloses a synchronizer for Fiber Channel applications. Crandell et al. (US 4,873,703), Williams et al. (US 5,084,841), Susnow (US 6,594,329), Parruck et al. (US 5,142,529), Smith (US 4,839,893), Trischitta et al. (Artech House) disclose arrangements for synchronizing data between clocks of different frequencies.



***Examiner Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Baranyai whose telephone number is (703) 305-8707. The examiner can normally be reached on Monday-Thursday: 6:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (703) 308-6602. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lb



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